CSE18R272-LAB MANUAL

KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION

COMPUTER SCIENCE AND EDUCATION

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Section: A5

Course name: java programming

Course Code: CSE18R272

1. Find mean and standard deviation.

Program:

```java
import java.util.Scanner;
import java.lang.*;
public class MeanSd {

    public static void main(String[] args){
        int Array[];
        System.out.println("enter the elements of array; ");
        int s = 0,i=0;
        float mean = 0,sd;
        Scanner sc=new Scanner(System.in);
        int n = sc.nextInt();
        Array = new int[5];

        for(i=1;i<5;i++){
            Array[i]=sc.nextInt();
            s=s+Array[i];
        }
        float sum=0;
        for(i=1;i<5;i++){
            float dist = Array[i]-mean;
            sum+=dist*dist;
```

```java
        }
        sd= (float) Math.sqrt((sum/5));

        mean = s/5;
        System.out.println(mean);
        System.out.println(sd);




    }


}
```

2. Find the nCr and nPr.

Program:

```java
import java.util.Scanner;
public class combination {
    public static int factorial(int n)
    {
        int fact=1, i;
        for(i=1; i<=n; i++)
        {
            fact = fact*i;
        }
        return fact;
    }
```

```java
public static void main(String args[])
{
    int n, r;
    Scanner scan = new Scanner(System.in);

    System.out.print("Enter Value of n : ");
    n = scan.nextInt();
    System.out.print("Enter Value of r : ");
    r = scan.nextInt();
    int ncr= (factorial(n)/(factorial(n-r)*factorial(r)));
    int npr= (factorial(n)/(factorial(n-r)));

    System.out.print("NCR = "+ncr);
    System.out.print("\nNPR = " +npr);
}

}
```

3. Print all prime numbers in the given range.

Program:

```java
import java.util.Scanner;
public class Prime number {
    static void isprime(int n){
        int i= 0;
        for(i=2;i<=n/2;i++){
            if(n%i==0){
                System.out.println(n+"is not a prime number");
                break;
```

```java
        }
      else{
          System.out.println(n+"is a prime number");
          break;
      }


      }



  }
  public static void main(String[] args){
      Prime p = new Prime();
      Scanner in = new Scanner(System.in);
      System.out.println("enter the number:");
      int n;
      n = in.nextInt();
      p.isprime(n);


  }
}


4. Find sum of the digits.
import java.util.Scanner;
public class Sum of digits {
  static int sum(int n){
      int s=0;
```

```java
        while(n!=0){
            s+=n%10;
            n=n/10;


        }
        return s;
    }
    public static void main(String[] args){
        Sod sol = new Sod();
        Scanner in = new Scanner(System.in);
        System.out.println("enter the number:");
        int n;
        n = in.nextInt();
        int su = sol.sum(n);
        System.out.println(su);


    }


}
```

5. Check whether a given number is palindrome or not.

Program:

```java
import java.util.Scanner;
public class Palindrome {

    public static void main(String[] args){
```

```java
        Scanner sc=new Scanner(System.in);

System.out.print("Enter the number to check : ");
        int number = sc.nextInt();
        int a,s=0;
        int n=number;
        while(number!=0){
            a=number%10;
            s=s*10+a;
            number=number/10;
        }
        if(s==n){
            System.out.println("palindrome number ");
        }
        else{
            System.out.println("not palindrome");

        }

    }

}
```

6. Check whether a given number is prime factor or not.

Program:

import java.util.Scanner;

```java
public class PrimeFactors {
  public static void main(String args[]){
    int number;
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter a number ::");
    number = sc.nextInt();

    for(int i = 2; i< number; i++) {
      while(number%i == 0) {
        System.out.println(i+" ");
        number = number/i;
      }
    }
    if(number >2) {
      System.out.println(number);
    }
  }
}
```

7. Check whether a given number is perfect number or not.

Program:

```java
import java.util.Scanner;
public class Perfect {
  public static void main(String[] args){
    int n,sum =0;
    Scanner s = new Scanner(System.in);
    System.out.print("Enter any integer you want to check:");
    n = s.nextInt();
    for(int i = 1; i < n; i++)
    {
      if(n % i == 0)
      {
        sum = sum + i;
      }
    }
    if(sum == n)
    {
      System.out.println("Given number is Perfect");
    }
    else
    {
      System.out.println("Given number is not Perfect");
    }
  }


}
```

8. Check whether a given number is deficient number or not.

Program:

```java
import java.util.Scanner;
public class Deficient number {
    public static void main(String[] args){
        int n,sum =0;
        Scanner s = new Scanner(System.in);
        System.out.print("Enter any integer you want to check:");
        n = s.nextInt();
        for(int i = 1; i < n; i++)
        {
            if(n % i == 0)
            {
                sum = sum + i;
            }
        }
        if(sum < n)
        {
            System.out.println("Given number is Deficient");
        }
        else
        {
            System.out.println("Given number is not Deficient");
        }
    }
```

```
        }


9. Apply any one of the sorting algorithm.

Program:

import java.util.Scanner;

public class Sort algorithm {

    public static void main(String[] args){

        int arr[];

        System.out.println("enter the elements of array; ");

        int s = 0,i=0;


        arr = new int[5];

        Scanner sc=new Scanner(System.in);

        for(i=0;i<5;i++){

            arr[i]=sc.nextInt();

        }

        int n = arr.length;

        for ( i = 0; i < n-1; i++){

            for (int j = 0; j < n-i-1; j++){

                if (arr[j] > arr[j+1])

                {

                    int temp = arr[j];

                    arr[j] = arr[j+1];

                    arr[j+1] = temp;

                }

            }

        }
```

```java
    for (i=0; i<n; ++i){
        System.out.print(arr[i] + " ");
    System.out.println();
  }
  }



  }
```

10. Number conversion from decimal to binary.

Program:

```java
import java.util.Scanner;
import java.lang.*;
public class Decimal to Binary {
    public static void main(String[] args){
        int Array[];
        Array= new int[100];
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the decimal value: ");
        int n = sc.nextInt();
        int i=0;
        while(n>0){
            Array[i]=n%2;
            n=n/2;
            i++;

        }
        for(int j=i-1;j>=0;j--){
```

```java
            System.out.print(Array[j]);
        }
    }



}



11. Write a program to complete and exp(e)

exp(e)= 1 + x/1! + x^2/2! + x^3/3! + ......

Program:

import java.util.Scanner;

public class Exponential {

    static float exponential(int n, float x)
    {


        float sum = 1;


        for (int i = n - 1; i > 0; --i )
            sum = 1 + x * sum / i;


        return sum;
    }



    public static void main (String[] args)
    {
```

```java
        System.out.print("Enter Starting Number : ");

        Scanner sc=new Scanner(System.in);

int n = sc.nextInt();

        float x = 1;

        System.out.println("e^x = "+exponential(n,x));

   }

}
```

12. Program to compute row sum, column sum and trace of a matrix

Program:

```java
import java.io.*;


class Matrix {


static int m = 4;

static int n = 4;

static void row_sum(int arr[][])

{


   int i,j,sum = 0;


   System.out.print( "\nFinding Sum of each row:\n\n");



   for (i = 0; i < 4; ++i) {
      for (j = 0; j < 4; ++j) {
```

```java
                sum = sum + arr[i][j];
        }


        System.out.println( "Sum of the row "
            + i + " = " + sum);


            sum = 0;
    }
}


static void column_sum(int arr[][])
{

    int i,j,sum = 0;


    System.out.print( "\nFinding Sum of each column:\n\n");



    for (i = 0; i < 4; ++i) {
        for (j = 0; j < 4; ++j) {


            sum = sum + arr[j][i];
        }
```

```java
        System.out.println(
            "Sum of the column"
            + i + " = " + sum);



        sum = 0;
    }
}



    public static void main (String[] args) {
        int i,j;
    int [][]arr = new int[m][n];


    int x = 1;
    for (i = 0; i < m; i++)
        for (j = 0; j < n; j++)
            arr[i][j] = x++;
      row_sum(arr);
      column_sum(arr);
    }
}
```

13. Write a program to encrypt a code in Caesar's code

Program:

```java
class caesar code{
```

```java
String plain;
int key;

public caesar(String text,int k){
    plain=text;
    key=k;

}
String encrypt(){
    String out="";char ch;
    for (int i=0; i<plain.length(); i++){
        if(Character.isUpperCase(plain.charAt(i)))
            ch=(char)(((int)plain.charAt(i)-65+key)%26+65);
        else
            ch=(char)(((int)plain.charAt(i)-97+key)%26+97);
        out+=ch;

    }
    return out;
}
public static void main(String[] args) {
    caesar c = new caesar("Shalini", 9);

    String out = c.encrypt();
    System.out.println(out);
```

```
    }

}
```

14. Write a program Java Program to implement the Mono alphabetic Cipher.

program:

```
class Mono alphabetic cipher

{

static String encoder(char[] key)

{

String encoded = "";

boolean[] arr = new boolean[26];

for (int i = 0; i < key.length; i++)

{

if (key[i] >= 'A' && key[i] <= 'Z')

{

if (arr[key[i] - 65] == false)

{

encoded += (char) key[i];

arr[key[i] - 65] = true;

}

}
```

```
else if (key[i] >= 'a' && key[i] <= 'z')

{

if (arr[key[i] - 97] == false)

{

encoded += (char) (key[i] - 32);

arr[key[i] - 97] = true;

}

}

}


for (int i = 0; i < 26; i++)

{

if (arr[i] == false)

{

arr[i] = true;

encoded += (char) (i + 65);

}

}

return encoded;

}


static String cipheredIt(String msg, String encoded)

{

String cipher = "";
```

.

```java
for (int i = 0; i < msg.length(); i++)
{
if (msg.charAt(i) >= 'a' && msg.charAt(i) <= 'z')
{
int pos = msg.charAt(i) - 97;
cipher += encoded.charAt(pos);
}
else if (msg.charAt(i) >= 'A' && msg.charAt(i) <= 'Z')
{
int pos = msg.charAt(i) - 65;
cipher += encoded.charAt(pos);
}
else
{
cipher += msg.charAt(i);
}
}
return cipher;
}


public static void main(String[] args)
{

String key;
key = "Computer";
System.out.println("Keyword : " + key);
```

```java
String encoded = encoder(key.toCharArray());

String message = "Malasani Shalini";
System.out.println("Message before Ciphering : " + message);

System.out.println("Ciphered Text : " + cipheredIt(message,
encoded));
    }
}
```

15. Write a program Java Program to implement simple Encryption Decryption with Modulo 26

Program:

```java
class Substitution {

    String plain;

    public Substitution(String text){

    plain = text;

    }
    String encrypt() {
        String out="";

        String alpha="abcdefghijklmnopqrstuvwxyz";
        String sub="kdgfnslvbwahexjmqcpzrtyiuo";
            for (int i=0; i<plain.length(); i++)
```

```java
    {
        int key = 0;


            char ch = (char) ((( (int) plain.charAt(1) - 97 +key )% 26
+97);
            out = out + ch;


    } return out;


    }
    public static void main(String[] args)
{

    Substitution c = new Substitution("Shalini");
    String out = c.encrypt();
    System.out.println(out);
    }
}
```

16. Write a program Java Program for XOR Cipher.

Program:

```java
class xor{
    String plain;
    char key;


    public xor(String text,char k){
        plain=text;
```

```java
            key=k;


    }
    String encrypt(){
        String out="";char ch;
        for (int i=0; i<plain.length(); i++){


            ch=(char)((int)plain.charAt(i)^(int)key);
            out+=ch;


        }
        return out;
    }
    public static void main(String[] args) {
        xor c = new xor("Shalini",'M');


        String out = c.encrypt();
        System.out.println(out);




    }
}
```

17. Write a program Java Program for Latin alphabet cipher.

Program:

```java
class Latincipher{
String plain;

Latincipher (String text)
{
plain =text;
}

String encrypt()
{

String alpha="abcdefghijklmnopqrstuvwxyz";

String out="";

for(int i=0;i<plain.length();i++)
{
char ch=plain.charAt(i);
int p=alpha.indexOf(ch)+1;
out =out+p+" ";
}
return out;
}
```

```java
public static void main(String[] args) {

Latincipher c=new Latincipher("ShaliniMalasani");

String out=c.encrypt();

System.out.println(" encryption :"+out);

}

}
```

18. Write a program called Harmonic Sum to compute the sum of a harmonic series, as

shown below, where n=50000. The program shall compute the sum from left-to-right as

well as from the right-to-left. Are the two sums the same? Obtain the absolute difference

between these two sums and explain the difference. Which sum is more accurate?

```java
public class Main {

    public static void main(String args[]){

        int harmonic = 50000;

        double L2R=0, R2L=0;

        for(int i=1; i<=harmonic; i++){

            L2R += (double)(1)/i;

            R2L += (double)(1)/(harmonic-i+1);

        }

        double difference = R2L-L2R;


        System.out.println("left to right = " + L2R);

        System.out.println("right to left = " + R2L);
```

```java
            System.out.println("difference is " + difference);

    }

}
```

19. Write a program which prompts user for the number of students in a class (a non-

negative integer), and saves it in an int variable called num Students. It then prompts user

for the grade of each of the students (integer between 0 to 100) and saves them in an int

array called grades. The program shall then compute and print the average (in double

rounded to 2 decimal places) and minimum/maximum (in int).

Program:

```java
import java.util.Scanner;

public class GradesAverage {

    private final int LOWEST_GRADE  = 0;
    private final int HIGHEST_GRADE = 100;

    private int[] grades;

    private Scanner in;

    public static void main(String[] args)
```

```java
    {
        GradesAverage aGradesAverage = new GradesAverage();
        aGradesAverage.in = new Scanner(System.in);

        System.out.print("Enter the number of students: ");
        int numStudents = aGradesAverage.in.nextInt();

        aGradesAverage.run(numStudents);
    }

    private void run(int numStudents)
    {
        if (numStudents <= 0) {
            System.out.println("Invalid number of students.");
            return;
        }
        grades = new int[numStudents];

        double sum = 0;
        int   i  = 0;
        while (i < numStudents)
        {
            System.out.printf("Enter the grade for student %1$d: ", (i+1));
            int grade = in.nextInt();

            if ((grade >= LOWEST_GRADE) && (grade <= HIGHEST_GRADE)) {
```

```java
            grades[i] = grade;

            sum    += grade;

            i++;

            continue;

        }

        System.out.println("Invalid grade, try again...");

    }

    System.out.printf("The average is %1$.2f\n", (sum /
numStudents));

  }


}
```

20. Write a Java program to separate 0s on left side and 1s on right side of an array of 0s and

1s in random order.

Program:

```java
mport java.util.Arrays;

import java.util.Scanner;


public class Main {

   public static void main(String[] args)

   {

      int arr[] = new int[8];

      int result[];

      System.out.println("Original Array ");

      System.out.println(Arrays.toString(arr));

      Scanner sc = new Scanner(System.in);
```

```java
System.out.println("Enter the elements of the array:");
for(int i=0; i<8; i++)
{

    arr[i]=sc.nextInt();
}
int n = arr.length;

result = separate_arr(arr, n);
System.out.println("New Array ");
System.out.println(Arrays.toString(result));
}

static int [] separate_arr(int arr[], int n)
{
    int count = 0;

    for (int i = 0; i < n; i++) {
        if (arr[i] == 0)
            count++;
    }

    for (int i = 0; i < count; i++)
        arr[i] = 0;

    for (int i = count; i < n; i++)
```

```java
        arr[i] = 1;


    return arr;
  }
}
```

21. Write a Java program to add and remove a specific element from an array.

Program:

```java
import java.util.Scanner;

public class Delete
{
  public static void main(String[] args)
  {
    int n, x, flag = 1, loc = 0;
    Scanner s = new Scanner(System.in);
    System.out.print("Enter no. of elements you want in array:");
    n = s.nextInt();
    int a[] = new int[n];
    System.out.println("Enter all the elements:");
    for (int i = 0; i < n; i++)
    {
      a[i] = s.nextInt();
    }
    System.out.print("Enter the element you want to delete:");
    x = s.nextInt();
    for (int i = 0; i < n; i++)
    {
```

```java
        if(a[i] == x)
        {
            flag =1;
            loc = i;
            break;
        }
        else
        {
            flag = 0;
        }
    }
    if(flag == 1)
    {
        for(int i = loc+1; i < n; i++)
        {
            a[i-1] = a[i];
        }
        System.out.print("After Deleting:");
        for (int i = 0; i < n-2; i++)
        {
            System.out.print(a[i]+",");
        }
        System.out.print(a[n-2]);
    }
    else
    {
        System.out.println("Element not found");
```

```
            }
        }
    }
```

22. Write a program called CozaLozaWoza which prints the numbers 1 to 110, 11 numbers

per line. The program shall print "Coza" in place of the numbers which are multiples of 3,

"Loza" for multiples of 5, "Woza" for multiples of 7, "CozaLoza" for multiples of 3 and 5,

and so on. The output shall looklike:

1 2 Coza 4 Loza Coza Woza 8 Coza Loza 11

Coza 13 Woza CozaLoza 16 17 Coza 19 Loza CozaWoza 22

23 Coza Loza 26 Coza Woza 29 CozaLoza 31 32 Coza

Program:

```java
public class Main {
    public static void main(String args[]) {
    int i = 1;

    while (i <= 110) {
        boolean test = false;
        if (i % 3 == 0) {
            System.out.print("coza");
            test = true;
        }
        if (i % 5 == 0) {
            System.out.print("loza");
            test = true;
```

```java
        }
        if (i % 7 == 0) {
            System.out.print("woza");
            test = true;
        }
        if (!test) {
            System.out.print(i);
        }
        System.out.print(" ");
        if (i % 11 == 0) {
            System.out.println();
        }
        i++;
    }
}
```